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Title: ENDF62MT, A Multi-temperature Neutron Library for MCNP

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Submitted to: For distribution on the WWW for the MCNP community.

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memorandum

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SUBJECT: ENDF62MT, A Multi-temperature Neutron Library for MCNP (Rev.0)

A multi-temperature neutron data library has been produced for use with MCNP. Seven temperatures (77, 400, 500, 600, 800, 900, 1200 °K) for three nuclides, ²³⁵U, ²³⁸U, and ²³⁹Pu are available on the library as a companion to ENDF60 (300°K). The entries for this library are a part of the latest Table 1 for Appendix G available on the WWW or in hardcopy, and are listed below. We have used the same source evaluations as were used for the ENDF60 library, Release 2 of each nuclide. However, a tighter fractional tolerance on thinning was used for ENDF62MT, so the data files are larger in size than the corresponding 300° data files in the ENDF60 library. Sample input decks for the NJOY runs are included with this memorandum.

The standard QA procedures were used for each data file in this library:

- * the NJOY interpretative output files was examined
- * all cross-section data and heating numbers were examined graphically
- * a number of codes were run to check the threshold energies, secondary energy distributions for both neutrons and photons, etc.
- * and sample MCNP problems were run

Figures 1-6 show example plots of the total neutron cross section for ²³⁵U, ²³⁸U, and ²³⁹Pu over two energy regions, 10⁻⁷-10⁻⁵ and 1x10⁻⁵-2x10⁻⁵ MeV, at 300, 600, 900, and 1200 °K. One can see the most notable difference due to thinning in the ENDF60 data library for ²³⁸U in Figure 4.

Currently, this data library is available on CFS the secure network, but is not publicly available on the open. The library should only be distributed to those with support contracts with XTM. The library is stored on CFS under /x6data/ce/special/multitemp , and will become available in the standard XSDIR file during the next update this summer. This library may undergo changes, such as the addition of other temperatures and nuclides, prior to its public release.

Appendix G Information for the ENDF62MT Neutron Data Library (Rev. 0)

ZAID	Atomic Wt. Ratio	Library Name	Source	Date of Eval.	Temp. (°K)	Length (words)	Num. of Energies	E _{max} (MeV)	GPD	Nubar
92235.11c	233.0250	endf62mt	ENDF/B-VI.2	1989	77	696,398	78,912	20	yes	both
92235.12c	233.0250	endf62mt	ENDF/B-VI.2	1989	400	411,854	43,344	20	yes	both
92235.13c	233.0250	endf62mt	ENDF/B-VI.2	1989	500	379,726	39,328	20	yes	both
92235.14c	233.0250	endf62mt	ENDF/B-VI.2	1989	600	353,678	36,072	20	yes	both
92235.15c	233.0250	endf62mt	ENDF/B-VI.2	1989	800	316,622	31,440	20	yes	both
92235.16c	233.0250	endf62mt	ENDF/B-VI.2	1989	900	300,278	29,397	20	yes	both
92235.17c	233.0250	endf62mt	ENDF/B-VI.2	1989	1200	269,062	25,495	20	yes	both
92238.11c	236.0060	endf62mt	ENDF/B-VI.2	1993	77	621,385	74,481	20	yes	both
92238.12c	236.0060	endf62mt	ENDF/B-VI.2	1993	400	456,593	53,882	20	yes	both
92238.13c	236.0060	endf62mt	ENDF/B-VI.2	1993	500	433,681	51,018	20	yes	both
92238.14c	236.0060	endf62mt	ENDF/B-VI.2	1993	600	414,185	48,581	20	yes	both
92238.15c	236.0060	endf62mt	ENDF/B-VI.2	1993	800	386,305	45,096	20	yes	both
92238.16c	236.0060	endf62mt	ENDF/B-VI.2	1993	900	372,625	43,386	20	yes	both
92238.17c	236.0060	endf62mt	ENDF/B-VI.2	1993	1200	348,137	40,325	20	yes	both
94239.11c	236.9986	endf62mt	ENDF/B-VI.2	1993	77	568,756	62,522	20	yes	both
94239.12c	236.9986	endf62mt	ENDF/B-VI.2	1993	400	418,556	43,747	20	yes	both
94239.13c	236.9986	endf62mt	ENDF/B-VI.2	1993	500	395,964	40,923	20	yes	both
94239.14c	236.9986	endf62mt	ENDF/B-VI.2	1993	600	377,116	38,567	20	yes	both
94239.15c	236.9986	endf62mt	ENDF/B-VI.2	1993	800	350,292	35,214	20	yes	both
94239.16c	236.9986	endf62mt	ENDF/B-VI.2	1993	900	338,236	33,707	20	yes	both
94239.17c	236.9986	endf62mt	ENDF/B-VI.2	1993	1200	312,572	30,499	20	yes	both

Corresponding entries for the ENDF60 Neutron Data Library

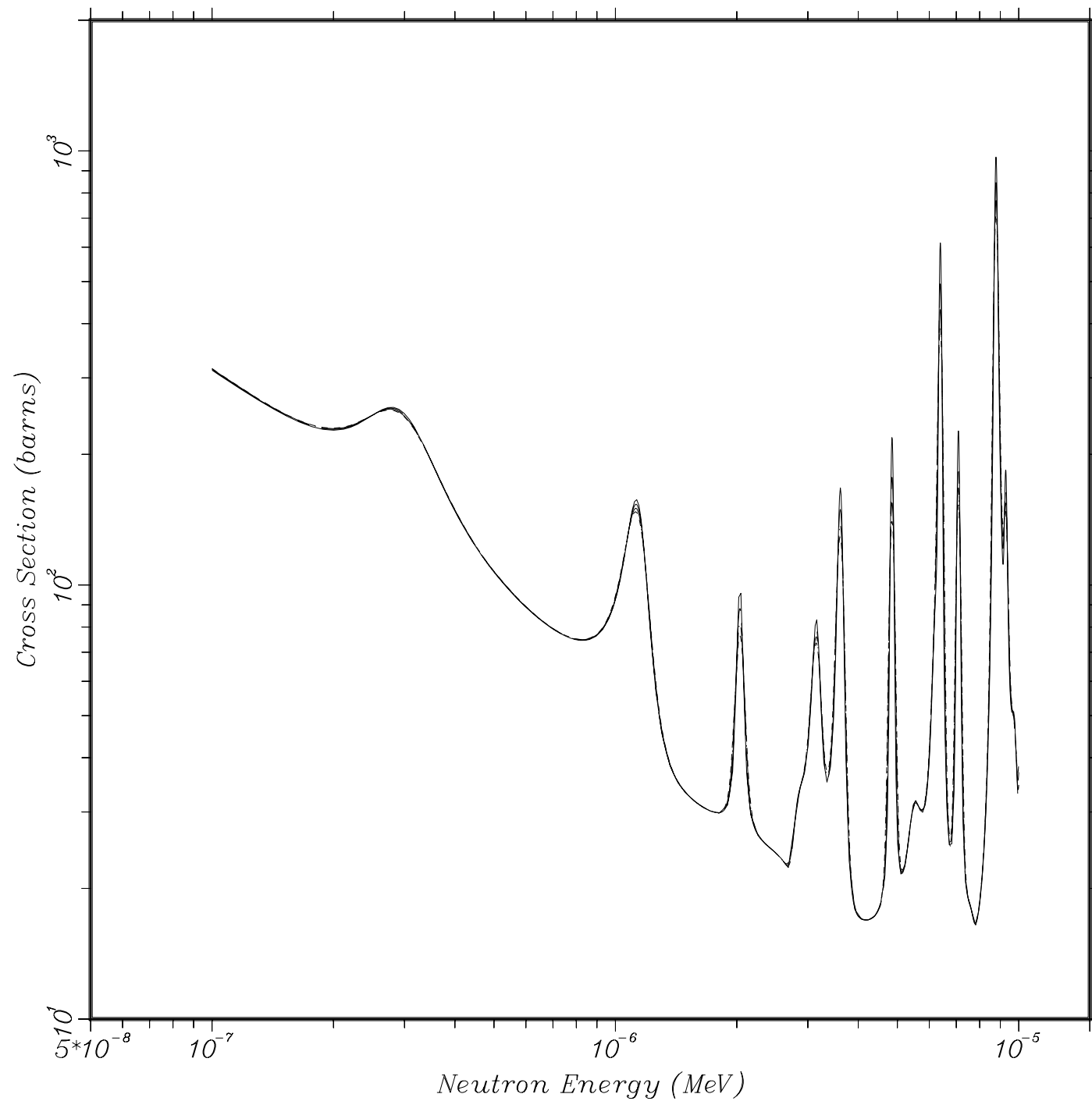
92235.60c	233.0250	endf60	ENDF/B-VI.2	1989	294	289,975	28,110	20	yes	both
92238.60c	236.0060	endf60	ENDF/B-VI.2	1993	294	206,322	22,600	20	yes	both
94239.60c	236.9986	endf60	ENDF/B-VI.2	1993	294	283,354	26,847	20	yes	both

Input deck for creating pendf tape with NJOY based on that used for the ENDF60 library (²³⁹Pu).

```
0
6
moder
20 -21
reconr
-21 -22
*pendf tape for endf/b-vi.2 pu-239b*/
9437 7 0 /
.002 0. 7 /
*94-pu-239b from endf/b-vi.2 tape 117 (young, lanl) */
*processed with the njoy nuclear data processing system*/
*see original endf/b-vi tape for details of evaluation*/
*the following reaction types are added*/
*   mt221   free thermal scattering*/
*   mt301   total heating kerma factor*/
*   mt443   kinematic kerma*/
0/
broadr
-22 -23
9437 9 0 1/
.002/
0 77 300 400 500 600 800 900 1200 /
0/
unresr
-21 -23 -24
9437 9 7 1
0 77 300 400 500 600 800 900 1200 /
1e10 1e4 1e3 300 100 30 10
0/
heatr
-21 -24 -25/
9437 1/
443/
stop
```

Input deck for creating ACE data file and interpretative output file with NJOY based on that used for the ENDF60 library at 1200 °K (^{239}Pu).

```
0
6
moder
20 -21
acer
-21 -25 0 31 32
1 0 1 .17/
*94-pu-239b from endf/b-vi.2*/
9437 1200.0/
.01/
/
acer
0 31 33 34 35
7 1 2 .17/
*94-pu-239b from endf/b-vi.2*/
stop
```



11/14/96

U - 235

MT = 1

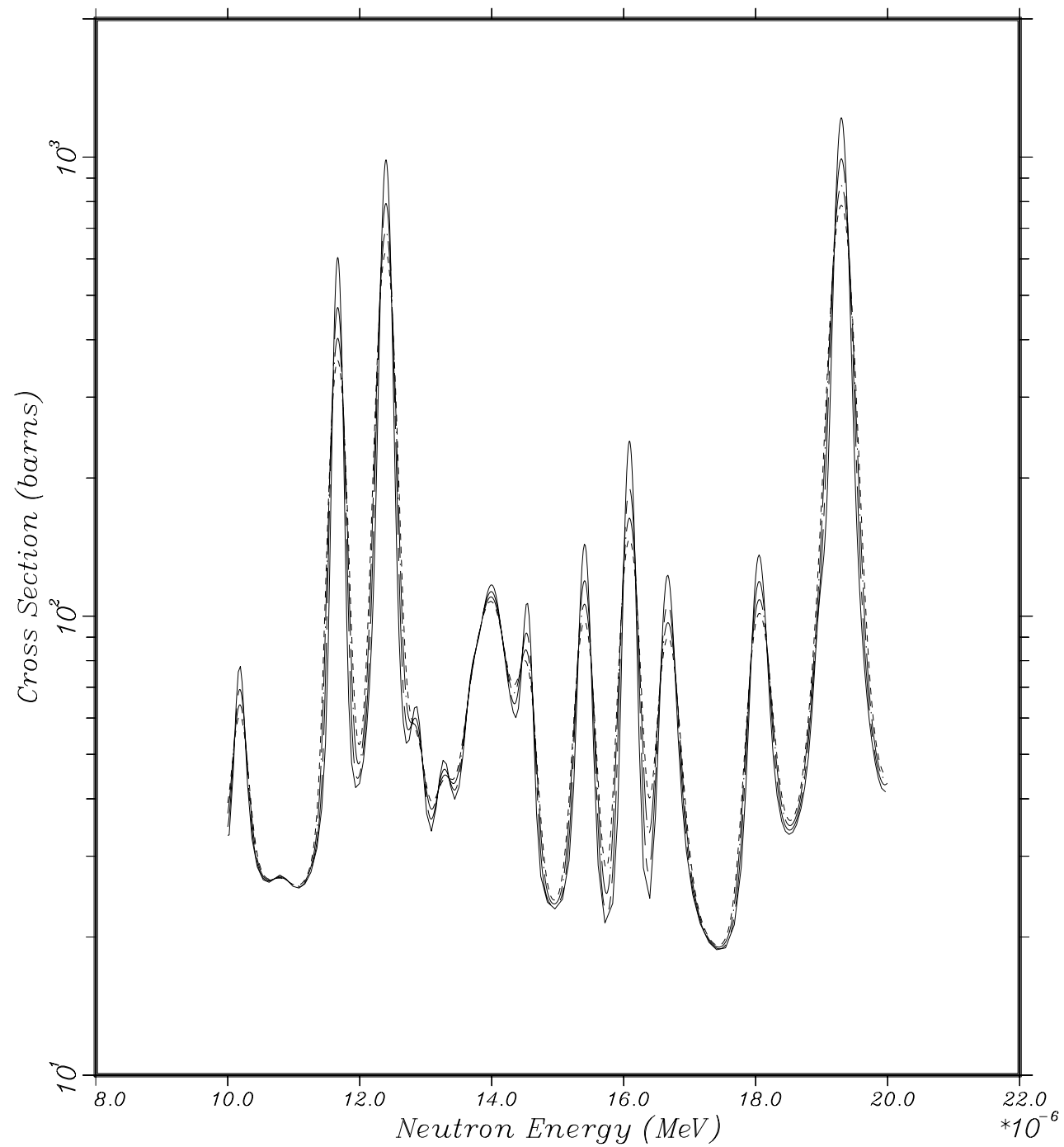
TOTAL

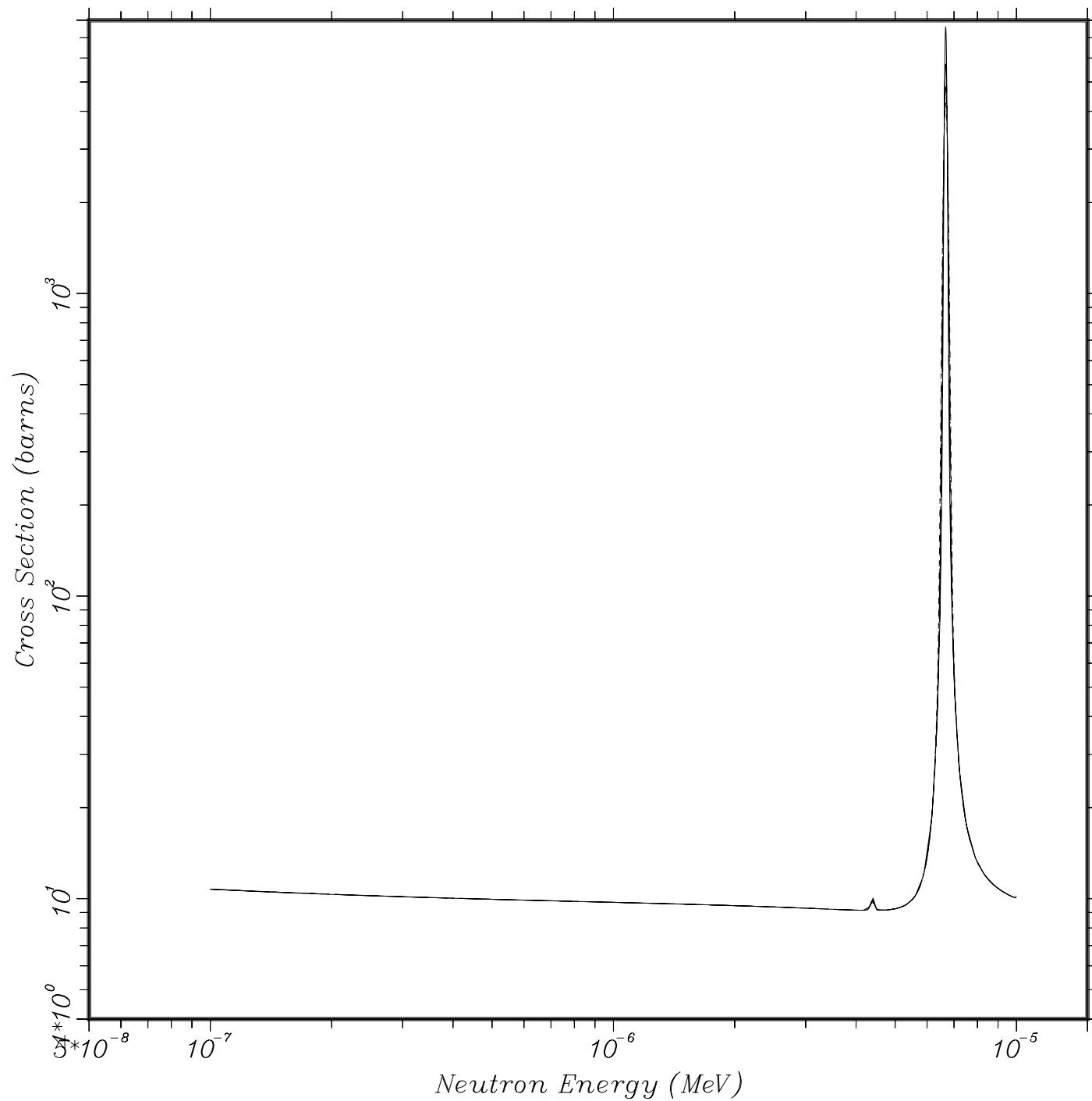
ZAID = 92235.60C
From ENDF602

ZAID = 92235.14C
From ENDF62MT

ZAID = 92235.16C
From ENDF62MT

ZAID = 92235.17C
From ENDF62MT





11/14/96

$U - 238$

$MT = 1$

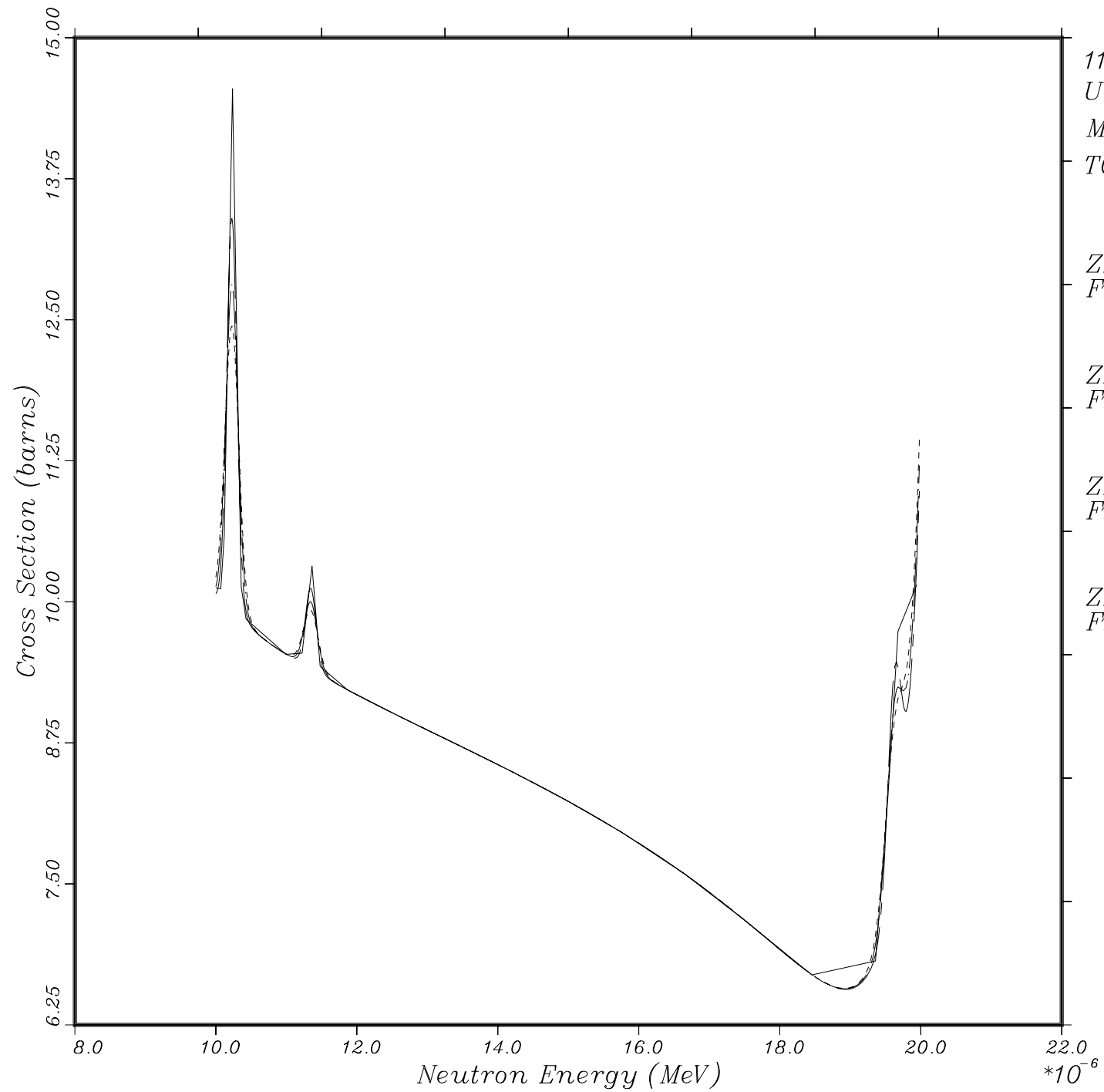
TOTAL

ZAID = 92238.60C
From ENDF602

ZAID = 92238.14C
From ENDF62MT

ZAID = 92238.16C
From ENDF62MT

ZAID = 92238.17C
From ENDF62MT



11/14/96

$U - 238$

$MT = 1$

TOTAL

ZAID = 92238.60C

From ENDF602

ZAID = 92238.14C

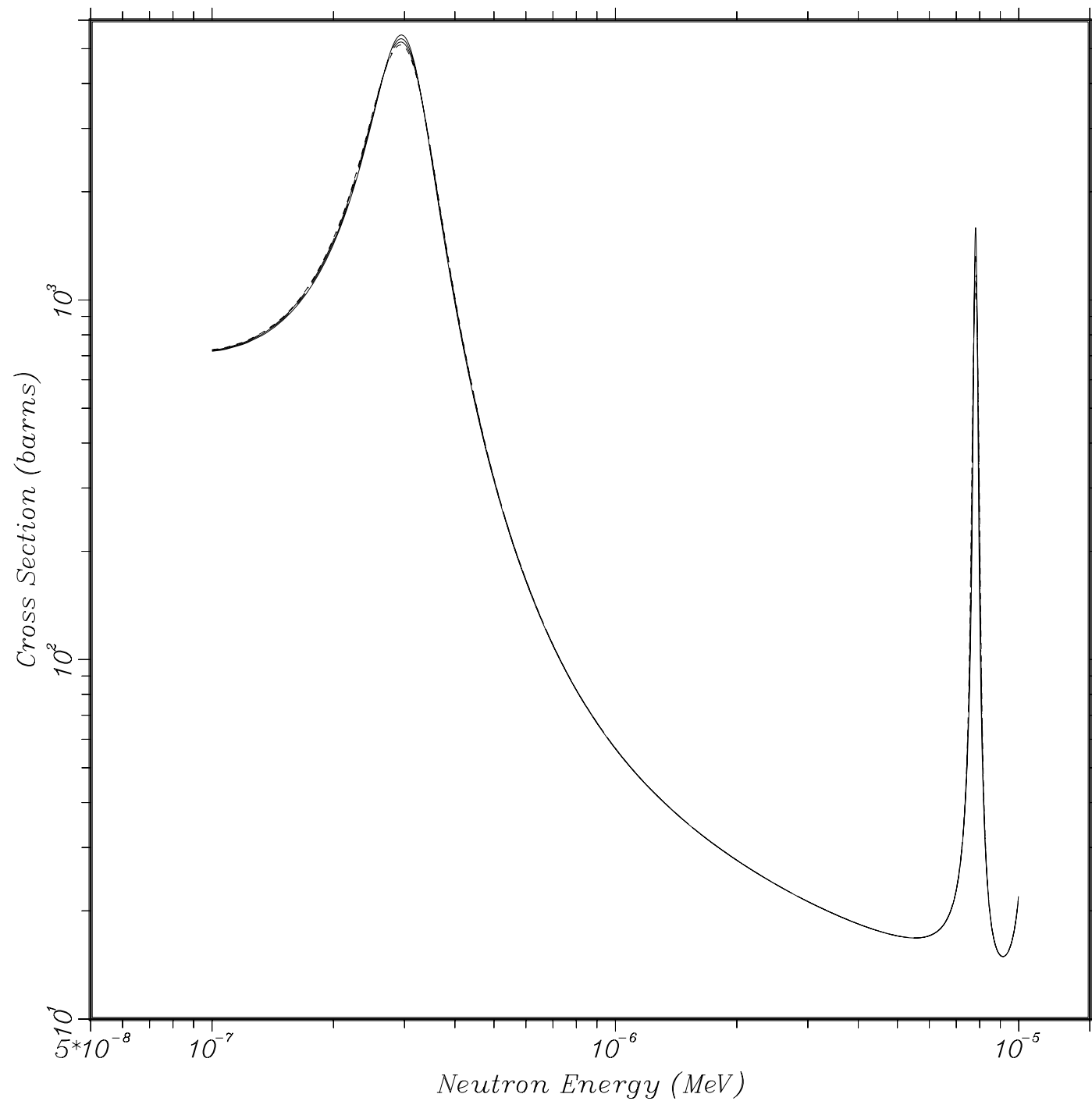
From ENDF62MT

ZAID = 92238.16C

From ENDF62MT

ZAID = 92238.17C

From ENDF62MT



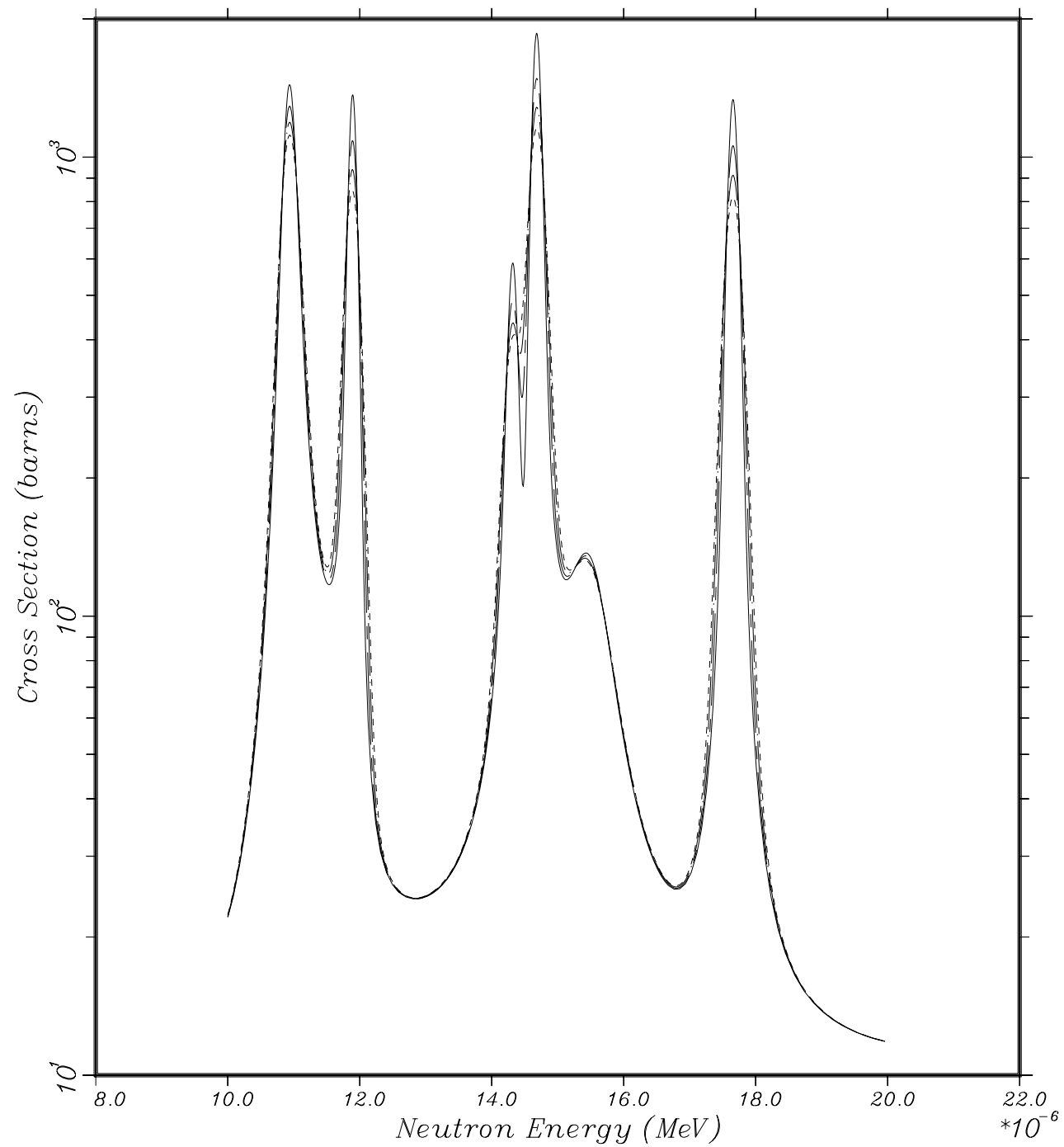
11/14/96
 $\text{Pu} - 239$
 $MT = 1$
TOTAL

ZAIID = 94239.60C
From ENDF602

ZAIID = 94239.14C
From ENDF62MT

ZAIID = 94239.16C
From ENDF62MT

ZAIID = 94239.17C
From ENDF62MT



11/14/96

$Pu - 239$

$MT = 1$

TOTAL

ZAID = 94239.60C
From ENDF602

ZAID = 94239.14C
From ENDF62MT

ZAID = 94239.16C
From ENDF62MT

ZAID = 94239.17C
From ENDF62MT